

### **III. Remarks**

Claims 1-42 were pending.

Claims 1-42 were rejected in the office action.

Claims 19-28 have been canceled. Claims 1-18 and 29-42 have been maintained in their original form. Reconsideration of this application in light of these amendments and the following remarks is respectfully requested.

#### **Information Disclosure Statement**

A supplemental information disclosure statement is being prepared and will be filed containing English translations of the references that have not been considered by the examiner, as indicated in paragraph (16) of the office action and in the copies of the information disclosure statements attached to the office action, which list these references as DE1,212,306; FR2700174; and FR1,177,028.

#### **Double Patenting**

Paragraph (1) of the office action asserts that claims 1-28 conflict with claims 1-28 of copending Application No. 10/431,680. Paragraph (1) follows form paragraph 8.29 as shown in MPEP §822. However, immediately preceding form paragraph 8.29, the MPEP states that form paragraph 8.29 "should be used when the conflicting claims are identical or conceded by the applicant to be not patentably distinct." (see MPEP §822). Here, for claims 1-18, neither of these conditions are satisfied: claims 1-18 of the present application and claims 1-18 of copending Application No. 10/706,154 are not identical, and Applicant concedes nothing. For claims 19-28 and pursuant to paragraph (1) of the present office action, Applicant has canceled claims 19-28.

#### **Obviousness-Type Double Patenting**

Claims 29-42 were provisionally rejected under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-28 of copending Application No. 10/431,680. In response, and pursuant to paragraph (2) of

the office action, Applicant files herewith a terminal disclaimer in compliance with 37 CFR 1.321(c) to overcome the provisional rejections. Applicant makes clear that the filing of the terminal disclaimer to obviate the rejections under the judicially-created doctrine of obviousness-type double patenting is not an admission of the propriety of the rejections (see MPEP §804.02(II)).

### **Independent Claim 1**

Independent claim 1 distinguishes over the patents applied in the present office action and is allowable for the following reasons.

#### ***Independent Claim 1 is Allowable Over U.S. Pat. No. 3,660,176 to Denhard, Jr.***

Independent claim 1 was rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 3,660,176 to Denhard, Jr. ("Denhard"). However, this rejection is not applicable to claim 1.

As the PTO recognizes in MPEP §2142:

*The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness.*

The examiner clearly cannot establish a *prima facie* case of obviousness in connection with claim 1 for the following reasons.

35 U.S.C. §103(a) provides that:

*[a] patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains ... (emphasis added)*

Thus, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, Denhard does not teach a fine-grained iron base alloy in which the ASTM grain size number is greater than or equal to 5, consisting

essentially of (wt. %):  $0.05 < C < 0.15$ ;  $7.5 < Cr < 15$ ;  $2 < Ni < 5$ ;  $Co < 4$ ,  $Cu < 1.2$ ;  $Mn < 5$ ;  $Si < 1$ ;  $(Mo + W) < 4$ ;  $0.01 < Ti < 0.75$ ;  $Zr < 1.6$ ;  $Ta < 3.2$ ;  $Hf < 3.2$ ;  $0.135 < (1.17Ti + 0.6Zr + 0.31Ta + 0.31Hf) < 1$ ;  $N < 0.02$ ;  $Al < 0.2$ ; Al and Si both present such that  $(Al + Si) > 0.01$ ; each of B, Ce, Ca, Mg, Sc, Y, La, and Be less than 0.1;  $P < 0.1$ ;  $S < 0.03$ ; each of Sn, Sb, O, Pb and other impurities less than 0.04; and the balance essentially iron, as claimed in claim 1.

In contrast, Denhard teaches steel containing about 0.3 to 2 percent aluminum (see Denhard, Col. 2, lines 11-14). Therefore, it is impossible to render the subject matter of claim 1 as a whole obvious based on Denhard, and the above explicit terms of the statute cannot be met. As a result, the examiner's burden of factually supporting a *prima facie* case of obviousness clearly cannot be met with respect to claim 1, and a rejection under 35 U.S.C. §103(a) is not applicable.

There is still another compelling, and mutually exclusive, reason why the Denhard patent cannot be applied to reject claim 1 under 35 U.S.C. §103(a).

The PTO also provides in MPEP §2142:

*[T]he examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. ...[I]mpermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.*

Here, Denhard does not teach, or even suggest, the desirability of providing a fine-grained iron base alloy in which the ASTM grain size number is greater than or equal to 5, consisting essentially of (wt. %):  $0.05 < C < 0.15$ ;  $7.5 < Cr < 15$ ;  $2 < Ni < 5$ ;  $Co < 4$ ,  $Cu < 1.2$ ;  $Mn < 5$ ;  $Si < 1$ ;  $(Mo + W) < 4$ ;  $0.01 < Ti < 0.75$ ;  $Zr < 1.6$ ;  $Ta < 3.2$ ;  $Hf < 3.2$ ;  $0.135 < (1.17Ti + 0.6Zr + 0.31Ta + 0.31Hf) < 1$ ;  $N < 0.02$ ;  $Al < 0.2$ ; Al and Si both present such that  $(Al + Si) > 0.01$ ; each of B, Ce, Ca, Mg, Sc, Y, La, and Be less than 0.1;  $P < 0.1$ ;  $S < 0.03$ ; each of Sn, Sb, O, Pb and other impurities less than 0.04; and the balance essentially iron, as claimed in claim 1.

Thus, Denhard does not provide any incentive or motivation supporting the desirability of the claimed combination. Therefore, there is simply no basis in the art for supporting a 35 U.S.C. §103(a) rejection of claim 1.

There is still another compelling, and mutually exclusive, reason why the Denhard patent cannot be applied to reject claim 1 under 35 U.S.C. §103(a).

The Denhard patent teaches that aluminum is used to obtain a precipitation hardening effect (see Denhard, Col. 1, lines 58-59), and cites three examples of PH steels containing aluminum for this purpose: PH 13-8 containing 1.2% Al, PH 12-9 containing 1% Al, and 16-6 PH containing 0.4% Al (see Denhard, Col. 1, lines 39-42 and 47-49). Indeed, these examples fall within Denhard's teaching of steel containing about 0.3 to 2 percent aluminum, as discussed above. Thus, this range and the cited examples clearly teach away from claim 1, recited above.

Since it is well recognized that teaching away from the claimed invention is a *per se* demonstration of lack of prima facie obviousness, it is clear that the examiner has not borne the initial burden of factually supporting any prima facie conclusion of obviousness.

Thus, for this reason alone, the examiner's burden of factually supporting a prima facie case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

There is still another compelling, and mutually exclusive, reason why the Denhard patent cannot be applied to reject claim 1 under 35 U.S.C. §103(a).

If the Denhard patent disclosed steel containing less than about 0.3 percent aluminum, as required by the rejection, the aluminum would be rendered inoperable for its intended purpose because Denhard teaches that aluminum is added to PH steels as a precipitation hardening constituent element, and that a relatively large amount of aluminum is required to generate the desired high strength of the steel (see Denhard, Col. 1, lines 54-63). To this end, Denhard clearly teaches that "[a] best combination of results is had in the steel containing . . . aluminum about 0.4 to 1.5 percent." (see Denhard, Col. 2, lines 19-22).

Thus, since providing a steel containing less than about 0.3 percent aluminum clearly destroys the purpose or function of the aluminum as disclosed in the Denhard patent, one of ordinary skill in the art would not have found a reason to produce steel containing less than about 0.3 percent aluminum, as required by the rejection.

Thus, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

***Independent Claim 1 is Allowable Over U.S. Pat. No. 6,030,469 to Ernst et al.***

Independent claim 1 was rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,030,469 to Ernst et al. ("Ernst"). However, this rejection is not applicable to claim 1.

As discussed above, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, Ernst does not teach a fine-grained iron base alloy in which the ASTM grain size number is greater than or equal to 5, consisting essentially of (wt. %):  $0.05 < C < 0.15$ ;  $7.5 < Cr < 15$ ;  $2 < Ni < 5$ ;  $Co < 4$ ,  $Cu < 1.2$ ;  $Mn < 5$ ;  $Si < 1$ ;  $(Mo + W) < 4$ ;  $0.01 < Ti < 0.75$ ;  $Zr < 1.6$ ;  $Ta < 3.2$ ;  $Hf < 3.2$ ;  $0.135 < (1.17Ti + 0.6Zr + 0.31Ta + 0.31Hf) < 1$ ;  $N < 0.02$ ;  $Al < 0.2$ ; Al and Si both present such that  $(Al + Si) > 0.01$ ; each of B, Ce, Ca, Mg, Sc, Y, La, and Be less than 0.1;  $P < 0.1$ ;  $S < 0.03$ ; each of Sn, Sb, O, Pb and other impurities less than 0.04; and the balance essentially iron, as claimed in claim 1.

In contrast, Ernst teaches steel containing 0.12-0.25% of N, 0.12-0.2% of N, and 0.12-0.18% of N (see Ernst, Col. 7, lines 54-61 and Col. 12, lines 53, 58-59 and 64). Therefore, it is impossible to render the subject matter of claim 1 as a whole obvious based on Ernst, and the above explicit terms of the statute cannot be met. As a result, the examiner's burden of factually supporting a *prima facie* case of obviousness clearly cannot be met with respect to claim 1, and a rejection under 35 U.S.C. §103(a) is not applicable.

There is still another compelling, and mutually exclusive, reason why the Ernst patent cannot be applied to reject claim 1 under 35 U.S.C. §103(a). Here, Ernst does not teach, or even suggest, the desirability of providing a fine-grained iron base alloy in which the ASTM grain size number is greater than or equal to 5, consisting essentially of (wt. %):  $0.05 < C < 0.15$ ;  $7.5 < Cr < 15$ ;  $2 < Ni < 5$ ;  $Co < 4$ ,  $Cu < 1.2$ ;  $Mn < 5$ ;  $Si < 1$ ;  $(Mo + W) < 4$ ;  $0.01 < Ti < 0.75$ ;  $Zr < 1.6$ ;  $Ta < 3.2$ ;  $Hf < 3.2$ ;  $0.135 < (1.17Ti + 0.6Zr + 0.31Ta + 0.31Hf) < 1$ ;  $N < 0.02$ ;  $Al < 0.2$ ; Al and Si both present such that  $(Al + Si) > 0.01$ ; each of B, Ce, Ca, Mg, Sc, Y, La, and Be less than 0.1;  $P < 0.1$ ;  $S < 0.03$ ; each of Sn, Sb, O, Pb and other impurities less than 0.04; and the balance essentially iron, as claimed in claim 1.

Thus, Ernst does not provide any incentive or motivation supporting the desirability of the claimed combination. Therefore, there is simply no basis in the art for supporting a 35 U.S.C. §103(a) rejection of claim 1.

There is still another compelling, and mutually exclusive, reason why the Ernst patent cannot be applied to reject claim 1 under 35 U.S.C. §103(a).

In the present case the Ernst patent teaches an alloy in which the carbon content should be limited because carbon promotes the formation of ductility-reducing precipitation phases such as  $M_{23}C_6$  and  $M_2(C,N)$  (see Ernst, Col. 7, line 63 through Col. 8, line 3). As a result, Ernst teaches that "a preferred range is less than 0.05% by weight of C" and "[a]n especially preferred range is less than 0.03% by weight of C." (see Ernst, Col. 8, lines 5-7). Thus, these preferred ranges clearly teach away from claim 1, recited above.

Since it is well recognized that teaching away from the claimed invention is a *per se* demonstration of lack of prima facie obviousness, it is clear that the examiner has not borne the initial burden of factually supporting any prima facie conclusion of obviousness.

Thus, for this reason alone, the examiner's burden of factually supporting a prima facie case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

There is still another compelling, and mutually exclusive, reason why the Ernst patent cannot be applied to reject claim 1 under 35 U.S.C. §103(a).

Although the examiner asserts that modifying the alloy disclosed in Ernst so that it contains less than 0.02%N is well within the skill of the artisan (see Office Action, page 5, paragraph 12), this type of modification destroys the intended function of N as disclosed in the Ernst patent.

More particularly, Ernst teaches that a high precipitation volume fraction of VN alloy nitrides is necessary to provide effective strength and, in order to achieve this volume fraction, Ernst teaches that at least 0.5% by weight vanadium (V) is required (see Ernst, Col. 7, lines 31-42). That is, 0.5% by weight V is the minimum amount of V necessary to provide effective strength. Ernst further discloses that nitrogen (N) is alloyed in almost stoichiometric proportions with the alloy-nitride former V (see Ernst, Col. 2, lines 5-6). Therefore, by requiring a minimum 0.5% by weight V, Ernst implicitly requires that the minimum amount of N necessary to provide effective strength is 0.14 wt. % N.<sup>1</sup>

As taught by Ernst, an amount of N that is less than 0.14 wt. % will destroy the purpose or function of N, which is providing effective strength. Thus, since providing a steel containing less than 0.14 wt. % N clearly destroys the purpose or function of the nitrogen as disclosed in Ernst, one of ordinary skill in the art would not have found a reason to produce steel containing less than 0.14 wt. % N, as required by the rejection.

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<sup>1</sup> 0.5 wt % V is required by Ernst  
0.5 wt. % V  $\approx$  0.55 atom % V  
if V:N stoichiometry is 1:1, then 0.55 atom % N is needed  
0.55 atom % N  $\approx$  0.14 wt. % N  
 $\therefore$  0.14 wt. % N is implicitly required by Ernst

Thus, for this mutually exclusive reason, the examiner's burden of factually supporting a prima facie case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

#### **Dependent Claims 2-4**

Dependent claims 2-4 were rejected under 35 U.S.C. §103(a) as being unpatentable over Denhard, and were rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst.

Dependent claims 2-4 depend from, and further limit, independent claim 1 in a patentable sense and therefore are allowable over Denhard, and are allowable over Ernst.

#### **Independent Claim 5**

Independent claim 5 was rejected under 35 U.S.C. §103(a) as being unpatentable over Denhard, and was rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst.

Independent claim 5 distinguishes over the patents applied in the present office action and is allowable over Denhard for the reasons described above in connection with independent claim 1, and is allowable over Ernst for the reasons described above in connection with independent claim 1.

#### **Dependent Claims 6-8**

Dependent claims 6-8 were rejected under 35 U.S.C. §103(a) as being unpatentable over Denhard, and were rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst.

Dependent claims 6-8 depend from, and further limit, independent claim 5 in a patentable sense and therefore are allowable over Denhard, and are allowable over Ernst.



### **Independent Claim 9**

Independent claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst.

Independent claim 9 is a method version of claim 5, and therefore is allowable over Ernst for the reasons described above in connection with independent claim 5.

### **Dependent Claims 10-18**

Dependent claims 10-18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst.

Dependent claims 10-18 depend from, and further limit, independent claim 9 in a patentable sense and therefore are allowable over Ernst.

### **Independent Claim 29**

Independent claim 29 distinguishes over the patents applied in the present office action and is allowable for the following reasons.

#### ***Independent Claim 29 is Allowable Over Denhard***

Independent claim 29 was rejected under 35 U.S.C. §103(a) as being unpatentable over Denhard. However, this rejection is not applicable to claim 29.

As discussed above, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, Denhard does not teach a fine-grained iron base martensitic alloy in which the ASTM grain size number is greater than or equal to 5, consisting essentially of (wt. %):  $0.05 < C < 0.15$ ;  $7.5 < Cr < 15$ ;  $1 < Ni < 5$ ;  $Co < 10$ ;  $Cu < 5$ ;  $Mn < 5$ ;  $Si < 1.5$ ;  $(Mo + W) < 4$ ;  $0.01 < Ti < 0.75$ ;  $Zr < 1.6$ ;  $Ta < 3.2$ ;  $Hf < 3.2$ ;  $0.135 < (1.17 Ti + 0.6 Zr + 0.31 Ta + 0.31 Hf) < 1$ ;  $V < 2$ ;  $Nb < 1$ ;  $N < 0.05$ ;  $Al < 0.2$ ;  $(Al + Si) > 0.01$ ; each of B, Ce, Ca, Mg, Sc, Y, La, and Be less than 0.1;  $P < 0.1$ ;  $S < 0.03$ ; each of Sn, Sb, O, Pb and other impurities less than 0.04; and the balance essentially iron, as claimed in claim 29.

In contrast, Denhard discloses an aluminum range of 0.3 to 2 percent (see Denhard, Col. 2, lines 11-14). Therefore, it is impossible to render the subject matter of claim 29 as a whole obvious based on Denhard, and the above explicit terms of the statute cannot be met. As a result, the examiner's burden of factually supporting a *prima facie* case of obviousness clearly cannot be met with respect to claim 29, and a rejection under 35 U.S.C. §103(a) is not applicable.

There is still another compelling, and mutually exclusive, reason why the Denhard patent cannot be applied to reject claim 29 under 35 U.S.C. §103(a). Here, Denhard does not teach, or even suggest, the desirability of providing a fine-grained iron base martensitic alloy in which the ASTM grain size number is greater than or equal to 5, consisting essentially of (wt. %):  $0.05 < C < 0.15$ ;  $7.5 < Cr < 15$ ;  $1 < Ni < 5$ ;  $Co < 10$ ;  $Cu < 5$ ;  $Mn < 5$ ;  $Si < 1.5$ ;  $(Mo + W) < 4$ ;  $0.01 < Ti < 0.75$ ;  $Zr < 1.6$ ;  $Ta < 3.2$ ;  $Hf < 3.2$ ;  $0.135 < (1.17 Ti + 0.6 Zr + 0.31 Ta + 0.31 Hf) < 1$ ;  $V < 2$ ;  $Nb < 1$ ;  $N < 0.05$ ;  $Al < 0.2$ ;  $(Al + Si) > 0.01$ ; each of B, Ce, Ca, Mg, Sc, Y, La, and Be less than 0.1;  $P < 0.1$ ;  $S < 0.03$ ; each of Sn, Sb, O, Pb and other impurities less than 0.04; and the balance essentially iron, as claimed in claim 29.

Thus, Denhard does not provide any incentive or motivation supporting the desirability of the claimed combination. Therefore, there is simply no basis in the art for supporting a 35 U.S.C. §103(a) rejection of claim 29.

There is still another compelling, and mutually exclusive, reason why the Denhard patent cannot be applied to reject claim 29 under 35 U.S.C. §103(a).

The Denhard patent teaches that aluminum is used to obtain a precipitation hardening effect (see Denhard, Col. 1, lines 58-59), and cites three examples of PH steels containing aluminum for this purpose: PH 13-8 containing 1.2% Al, PH 12-9 containing 1% Al, and 16-6 PH containing 0.4% Al (see Denhard, Col. 1, lines 39-42 and 47-49). Indeed, these examples fall within Denhard's teaching of steel containing about 0.3 to 2 percent aluminum, as discussed above. Thus, this range and the cited examples clearly teach away from claim 29, recited above.

Since it is well recognized that teaching away from the claimed invention is a *per se* demonstration of lack of prima facie obviousness, it is clear that the examiner has not borne the initial burden of factually supporting any prima facie conclusion of obviousness.

Thus, for this reason alone, the examiner's burden of factually supporting a prima facie case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

There is still another compelling, and mutually exclusive, reason why the Denhard patent cannot be applied to reject claim 29 under 35 U.S.C. §103(a).

If the Denhard patent disclosed steel containing less than about 0.3 percent aluminum, as required by the rejection, the aluminum would be rendered inoperable for its intended purpose because Denhard teaches that aluminum is added to PH steels as a precipitation hardening constituent element, and that a relatively large amount of aluminum is required to generate the desired high strength of the steel (see Denhard, Col. 1, lines 54-63). To this end, Denhard clearly teaches that "[a] best combination of results is had in the steel containing . . . aluminum about 0.4 to 1.5 percent." (see Denhard, Col. 2, lines 19-22).

Thus, since providing a steel containing less than about 0.3 percent aluminum clearly destroys the purpose or function of the aluminum as disclosed in the Denhard patent, one of ordinary skill in the art would not have found a reason to produce steel containing less than about 0.3 percent aluminum, as required by the rejection.

Thus, for this mutually exclusive reason, the examiner's burden of factually supporting a prima facie case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

***Independent Claim 29 is Allowable Over Ernst***

Independent claim 29 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst. However, this rejection is not applicable to claim 29.

As discussed above, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, Ernst does not teach a fine-grained iron base martensitic alloy in which the ASTM grain size number is greater than or equal to 5, consisting essentially of (wt. %):  $0.05 < C < 0.15$ ;  $7.5 < Cr < 15$ ;  $1 < Ni < 5$ ;  $Co < 10$ ;  $Cu < 5$ ;  $Mn < 5$ ;  $Si < 1.5$ ;  $(Mo + W) < 4$ ;  $0.01 < Ti < 0.75$ ;  $Zr < 1.6$ ;  $Ta < 3.2$ ;  $Hf < 3.2$ ;  $0.135 < (1.17 Ti + 0.6 Zr + 0.31 Ta + 0.31 Hf) < 1$ ;  $V < 2$ ;  $Nb < 1$ ;  $N < 0.05$ ;  $Al < 0.2$ ;  $(Al + Si) > 0.01$ ; each of B, Ce, Ca, Mg, Sc, Y, La, and Be less than 0.1;  $P < 0.1$ ;  $S < 0.03$ ; each of Sn, Sb, O, Pb and other impurities less than 0.04; and the balance essentially iron, as claimed in claim 29.

In contrast, Ernst teaches steel containing 0.12-0.25% of N, 0.12-0.2% of N, and 0.12-0.18% of N (see Ernst, Col. 7, lines 54-61 and Col. 12, lines 53, 58-59 and 64). Therefore, it is impossible to render the subject matter of claim 29 as a whole obvious based on Ernst, and the above explicit terms of the statute cannot be met. As a result, the examiner's burden of factually supporting a *prima facie* case of obviousness clearly cannot be met with respect to claim 29, and a rejection under 35 U.S.C. §103(a) is not applicable.

There is still another compelling, and mutually exclusive, reason why the Ernst patent cannot be applied to reject claim 29 under 35 U.S.C. §103(a). Here, Ernst does not teach, or even suggest, the desirability of providing a fine-grained iron base martensitic alloy in which the ASTM grain size number is greater than or equal to 5, consisting essentially of (wt. %):  $0.05 < C < 0.15$ ;  $7.5 < Cr < 15$ ;  $1 < Ni < 5$ ;  $Co < 10$ ;  $Cu < 5$ ;  $Mn < 5$ ;  $Si < 1.5$ ;  $(Mo + W) < 4$ ;  $0.01 < Ti < 0.75$ ;  $Zr < 1.6$ ;  $Ta < 3.2$ ;  $Hf < 3.2$ ;  $0.135 < (1.17 Ti + 0.6 Zr + 0.31 Ta + 0.31 Hf) < 1$ ;  $V < 2$ ;  $Nb < 1$ ;  $N < 0.05$ ;  $Al < 0.2$ ;  $(Al + Si) > 0.01$ ; each of B, Ce, Ca, Mg, Sc, Y, La, and Be less than 0.1;  $P < 0.1$ ;  $S < 0.03$ ; each of Sn, Sb, O, Pb and other impurities less than 0.04; and the balance essentially iron, as claimed in claim 29.

Thus, Ernst does not provide any incentive or motivation supporting the desirability of the claimed combination. Therefore, there is simply no basis in the art for supporting a 35 U.S.C. §103(a) rejection of claim 29.

There is still another compelling, and mutually exclusive, reason why the Ernst patent cannot be applied to reject claim 29 under 35 U.S.C. §103(a).

In the present case the Ernst patent teaches an alloy in which the carbon content should be limited because carbon promotes the formation of ductility-reducing precipitation phases such as  $M_{23}C_6$  and  $M_2(C,N)$  (see Ernst, Col. 7, line 63 through Col. 8, line 3). As a result, Ernst teaches that "a preferred range is less than 0.05% by weight of C" and "[a]n especially preferred range is less than 0.03% by weight of C." (see Ernst, Col. 8, lines 5-7). Thus, these preferred ranges clearly teach away from claim 29, recited above.

Since it is well recognized that teaching away from the claimed invention is a *per se* demonstration of lack of prima facie obviousness, it is clear that the examiner has not borne the initial burden of factually supporting any prima facie conclusion of obviousness.

Thus, for this reason alone, the examiner's burden of factually supporting a prima facie case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

There is still another compelling, and mutually exclusive, reason why the Ernst patent cannot be applied to reject claim 29 under 35 U.S.C. §103(a).

Although the examiner asserts that modifying the alloy disclosed in Ernst so that it contains less than 0.05%N is well within the skill of the artisan (see Office Action, page 5, paragraph 12), this type of modification destroys the intended function of N as disclosed in the Ernst patent.

More particularly, Ernst teaches that a high precipitation volume fraction of VN alloy nitrides is necessary to provide effective strength and, in order to achieve this volume fraction, Ernst teaches that at least 0.5% by weight vanadium (V) is required (see Ernst, Col. 7, lines 31-42). That is, 0.5% by weight V is the minimum amount of V necessary to provide effective strength. Ernst further discloses that nitrogen (N) is alloyed in almost stoichiometric proportions with the alloy-nitride former V (see Ernst, Col. 2, lines 5-6). Therefore, by requiring a minimum 0.5% by weight V, Ernst implicitly

requires that the minimum amount of N necessary to provide effective strength is 0.14 wt. % N.<sup>2</sup>

As taught by Ernst, an amount of N that is less than 0.14 wt. % will destroy the purpose or function of N, which is providing effective strength. Thus, since providing a steel containing less than 0.14 wt. % N clearly destroys the purpose or function of the nitrogen as disclosed in Ernst, one of ordinary skill in the art would not have found a reason to produce steel containing less than 0.14 wt. % N, as required by the rejection.

Thus, for this mutually exclusive reason, the examiner's burden of factually supporting a prima facie case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103(a) should be withdrawn.

#### **Dependent Claims 30-32**

Dependent claims 30-32 were rejected under 35 U.S.C. §103(a) as being unpatentable over Denhard, and were rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst.

Dependent claims 30-32 depend from, and further limit, independent claim 29 in a patentable sense and therefore are allowable over Denhard, and are allowable over Ernst.

#### **Independent Claim 33**

Independent claim 33 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst.

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<sup>2</sup> 0.5 wt % V is required by Ernst

0.5 wt. % V  $\approx$  0.55 atom % V

if V:N stoichiometry is 1:1, then 0.55 atom % N is needed

0.55 atom % N  $\approx$  0.14 wt. % N

$\therefore$  0.14 wt. % N is implicitly required by Ernst

Independent claim 33 is a method version of claim 29, and therefore is allowable over Ernst for the reasons described above in connection with independent claim 29.

### Dependent Claims 34-42

Dependent claims 34-42 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst.

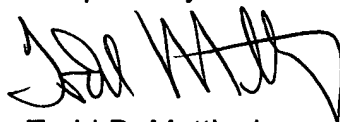
Dependent claims 34-42 depend from, and further limit, independent claim 33 in a patentable sense and therefore are allowable over Ernst.

### Conclusion

In view of all of the above, the allowance of claims 1-18 and 29-42 is respectfully requested.

The examiner is invited to call the undersigned at the below-listed telephone number if a telephone conference would expedite or aid the prosecution and examination of this application.

Respectfully submitted,



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Dated: 11/1/04

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